

**ENGINEERING STATEMENT SUPPORTING A  
PETITION FOR RECONSIDERATION**

prepared for

**United Communications Corporation**

KEYC-DT Mankato, Minnesota

Facility ID: 68853

Ch. 12 15.2 kW (MAX-DA) 317 m

United Communications Corporation (“United”) is the licensee of analog television station KEYC-TV Channel 12 and digital station KEYC-DT Channel 38, Facility ID: 68853, Mankato, Minnesota. United elected, for KEYC-TV’s post-transition facility, to operate on KEYC’s current analog Channel 12 in place of the 1998 allotted Channel 38. However, as a result of the channel election process, the actual coverage “foot-print” served by KEYC will be reduced from what it presently serves. Further, KEYC-TV Channel 12 currently operates using a non-directional antenna system. The final antenna pattern allotted by the Commission cannot be easily constructed with a real-world antenna. Using the existing non-directional antenna system forces KEYC to operate with a further reduction in power resulting in serious loss of coverage.

The instant engineering statement has been prepared to support a request for a change in the station’s “certification” to permit replication of the authorized analog Grade B contour and to provide a practical implementation using station’s existing non-directional Channel 12 antenna.

**Background**

Appendix B of the Second Memorandum Opinion And Order On Reconsideration Of The Fifth And Sixth Report And Orders <sup>1</sup> (“MO&O”) clearly indicates that the KEYC Channel 38 allotment achieved the DTV/NTSC area match. **Figure 1**, attached hereto, provides a graphical comparison of the analog Grade B contour with the allotted Channel 38 facility.

In November, 2004, television stations were asked to certify which DTV facility would be employed to “carry-over” to the final DTV channel. At this time in the process, United elected to employ the 1000 kW facility from the construction permit<sup>2</sup> facility as the coverage was believed to be somewhat larger than that of the Channel 38 replication allotment facility which was not the case. Unfortunately, the directional antenna pattern specified in the certified

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<sup>1</sup> See “*Second Memorandum Opinion And Order On Reconsideration Of The Fifth And Sixth Report And Orders, Advanced Television Systems And Their Impact Upon The Existing Television Broadcast Service*”, MM Docket No. 87-268, FCC 98-315, Released December 18, 1998.

<sup>2</sup> See BMPCDT-20000321AAO

construction permit combined with a lower side-mounted antenna height limited the coverage “foot-print” to less than that of the analog KEYC-TV service area. After the November 2004 certification date, corrections or changes to certifications were not permitted. Further, at no time in this process was United permitted to employ its authorized Grade B contour to “carry-over” to its elected final DTV channel.

With the release of the final table of allotments<sup>3</sup>, it became evident that the problems created by the odd shaped directional antenna patterns in the original 1998 table of allotments had now been translated to the final table of allotments. In the instant case, KEYC was allotted a directional antenna pattern that would limit the actual coverage foot-print. **Figure 2** provides a coverage comparison of the analog Channel 12 Grade B contour along with the allotted Channel 12 DTV service contour with its associated directional antenna pattern. As shown, coverage in certain areas is lost. Further, since the Commission has proposed to require stations to construct their final DTV facilities so as not to exceed the allotted coverage, a map showing the resulting non-directional 5.4 kW implementation of the final Channel 12 DTV facility is also provided. **Table I** provides a comparison of the population and area data. Population data for a 5.4 kW non-directional antenna facility is 309,346 persons, a reduction of 35,654 persons from the allotted facility population and is not a practical option for this station.

### **Change in Certification**

As an alternative, United proposes herein to modify its original certification to specify the authorized analog Grade B contour as the “carry-over” coverage foot-print for its final Channel 12 DTV facility. In the same manner as has been previously employed for Channel 38, a Channel 12 digital facility was designed, with an associated directional antenna pattern, that replicates the coverage of the Grade B contour. The technical details of the proposed facility are provided in **Table II**.

**Figure 3** provides a coverage comparison of the authorized analog Grade B contour with the proposed and allotted digital facilities. Also shown, is the coverage from a practical non-directional antenna implementation of the proposed allotment. As demonstrated in **Figure 3** and in **Table I**, the proposed change in certification allows for replication of the currently authorized

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<sup>3</sup> See Appendix B, “*Seventh Report and Order And Eighth Further Notice of Proposed Rule Making*”, MB Docket No. 87-268, FCC 07-138, Released August 6, 2007.

analog coverage foot-print. As shown, a non-directional implementation of the proposed certification easily achieves replication of the current analog Grade B coverage.

For completeness, a detailed interference study was conducted in accordance with the terrain dependent Longley-Rice point-to-point propagation model, per the Commission's Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, July 2, 1997 ("OET-69")<sup>4</sup>. The interference study examined the net change in interference as experienced by other stations that would result from the proposed facility (in lieu of the reference KEYC-DT allotted facility). Only facilities listed in Appendix B of the Seventh Report and Order were studied. As shown in **Table III**, interference to pertinent affected stations is below the 0.1% "new" interference limit.

## **Conclusion**

As demonstrated above, coverage for the KEYC-DT "post-transition" operation will be severely limited if the currently allotted DTV facility is employed. By changing the KEYC-DT certification to replicate the authorized Grade B contour, coverage by the Channel 12 DTV facility closely replicates current analog Channel 12 coverage and maintains service to the public. Further, the proposed DTV facility can be easily implemented with the existing installed Channel 12 antenna so that the analog shutdown deadline of February 17, 2009 can be met.

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<sup>4</sup> The implementation of OET-69 for this study followed the guidelines of OET-69 as specified therein. A standard cell size of 2 km was used. Comparisons of various results of this computer program to the Commission's implementation of OET-69 show good correlation.

## **Certification**

The undersigned hereby certifies that the foregoing statement was prepared by him or under his direction, and that it is true and correct to the best of his knowledge and belief. Mr. Mertz is a principal in the firm of *Cavell, Mertz & Associates, Inc.*, holds a Bachelor of Science degree from Oglethorpe University, and has submitted numerous engineering exhibits to the Federal Communications Commission. His qualifications are a matter of record with that agency.



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October 24, 2007

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## **Attachments**

Table I	Population Comparison to 1998 Digital Table of Allotments
Table II	Proposed Allotment Parameters
Table III	Interference Study Summary
Figure 1	Coverage Contour Comparison – Ch. 12 Analog Grade B Contour Ch. 38 1998 Allotment Service Contour
Figure 2	Coverage Contour Comparison – Ch. 12 Analog Grade B Contour Ch 12 R&O Allotment Service Contour Non-directional Implementation within the 7 <sup>th</sup> R&O Service Contour
Figure 3	Coverage Contour Comparison – Ch. 12 Analog Grade B Contour Proposed Ch. 12 Allotment Service Contour Non-directional Implementation Within Proposed Allotment Service Contour 7 <sup>th</sup> R&O Allotment Service Contour

Table I  
**POPULATION COMPARISON TO 1998 DIGITAL TABLE OF ALLOTMENTS**  
prepare for  
**United Communications Corporation**  
KEYC-DT Mankato, Minnesota  
Ch. 12 15.2 kW (MAX-DA) 317 m

	( a ) DTV Ch. 38	( b ) NTSC Ch. 12	( c ) NTSC Ch. 12	( d ) NTSC Ch. 12	( e ) DTV Ch. 12	( f ) DTV Ch. 12	( g ) DTV Ch. 12
	1998 Table Facility (1990 Census)	1998 Table Facility (1990 Census)	1998 Table Facility Calculated (1990 Census)	1998 Table Facility Calculated (2000 Census)	7th R&O Table (2000 Census)	Replication of 1998 Table Analog Facility (2000 Census)	Non-directional antenna Implementation (2000 Census)
<b>Population</b>	393,000	326,000	326,482	329,644	345,000	394,683	387,773
% difference from NTSC 1998 Table Facility	20.55%		0.15%	1.12%			
difference from column "d" facility					15,356	65,039	58,129
% difference from column "d" facility					4.66%	19.73%	17.63%
<b>Area</b>	29,278.0	25,681.0	25,680.7	25,624.4	26,737.0	29,045.5	28,897.3
% difference from NTSC 1998 Table Facility	14.01%		0.00%	-0.22%			
difference from column "d" facility					1,112.6	3,421.1	3,272.9
% difference from column "d" facility					4.34%	13.35%	12.77%

Check to show  
studied facility  
compares to 1998  
NTSC Table Facility of 2000 Census data.

Same study  
parameters as "c"  
only change is use  
of 2000 Census data.

Data from 7th R&O  
Table. (17.4 kW at  
291 m with FCC  
allotment antenna  
pattern)

15.2 kW at 317 m  
with odd shaped  
directional pattern

14.6 kW at 317 m

<b>Notes:</b>	<b><u>Column</u></b>	
<b>a</b>		From 1998 Table
<b>b</b>		From 1998 Table
<b>c</b>		1998 Table NTSC facility study using tv_process software
<b>d</b>		Facility study same as "c" except using 2000 Census data.
<b>e</b>		7th R&O Table facility on Ch. 12 (Based on side mounted UHF antenna)
<b>f</b>		Replication of 1998 analog facility on Ch. 12 - Does not cause 0.1% additional interference to affected stations
<b>g</b>		Non-directional implementation of facility in column "f"

Table II  
**PROPOSED ALLOTMENT PARAMETERS**  
 prepared for  
**United Communications Corporation**  
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Channel	DTV Channel 12
Site Coordinates	43° 56' 14" N 94° 24' 41" W (NAD-27)
Radiation Center	642 meters above mean sea level 317 meters above average terrain
Effective Radiated Power	15.2 kilowatts

**Directional Antenna Relative Field Pattern**

<b>Azimuth</b>	<b>Relative</b>	<b>Azimuth</b>	<b>Relative</b>
<b>(°T)</b>	<b>Field</b>	<b>(°T)</b>	<b>Field</b>
0	0.999	180	0.986
10	1.000	190	0.986
20	0.999	200	0.987
30	0.999	210	0.985
40	0.999	220	0.983
50	0.997	230	0.980
60	1.000	240	0.980
70	0.996	250	0.982
80	0.995	260	0.984
90	0.997	270	0.988
100	0.997	280	0.991
110	0.995	290	0.990
120	0.993	300	0.992
130	0.992	310	0.993
140	0.990	320	0.995
150	0.989	330	0.997
160	0.988	340	0.999
170	0.987	350	0.999

**Table III**  
**INTERFERENCE STUDY SUMMARY**  
 prepared for  
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<u>Channel</u>	<u>Affected Station</u>	<u>City</u>	<u>State</u>	<u>7th R&amp;O Table Baseline (2000 Census)</u>	<u>Calculated Baseline (2000 Census)</u>	<u>Interference Population 7th R&amp;O facility (2000 Census)</u>	<u>Interference Population with Proposal (2000 Census)</u>	<u>Population Difference</u>	<u>New Interference</u>
11	KARE	Minneapolis	MN	3,438,000	3,438,123	4,931	5,137	206	0.006%
11	KELO-TV	Sioux Falls	SD	530,000		- - -No interference - - -			
12	KIIN	Iowa City	IA	1,110,000	1,110,538	971	978	7	0.00%
12	KCCW-TV	Walker	MN	214,000	214,613	3,177	3,265	88	0.04%
12	KUON-TV	Lincoln	NE	1,145,000	1,145,080	1,053	1,055	2	0.00%
12	KTTM	Huron	SD	64,000	64,480	951	951	0	0.00%
13	KSFY-TV	Sioux Falls	SD	542,000	542,458	37,927	37,927	0	0.00%







